UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,892,762 B2
APPLICATION NO. : 10/087709
DATED : May 17, 2005
INVENTOR(S) : George K. Porter, Seth B. Wolf and Charles W. Albrecht

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The Title page showing the illustrative figure should be deleted and substituted with the attached title page.

Drawing Sheets 1 through 14 should be replaced with drawings Sheets 1 through 14 that are attached.

On the Title page, Item (56) under References Cited, the date "2/1955" for U.S. Patent No. 2,871,887 should read --4/1955--.

At column 11, line 56, "mare" should read --more--.

At column 12, line 37, delete "(iii)".

At column 12, line 50, delete "(iii)".

At column 13, line 52, "seated" should read --sealed--.

At column 15, line 6, "deliver" should read --delivery--.

At column 15, line 7, "fluid" should read --fluidic--.

At column 15, line 9, "deliver" should read --delivery--.

At column 15, line 10, "fluid" should read --fluidic--.

At column 16, line 1, "deliver" should read --delivery--.

At column 16, line 2, "fluid" should read --fluidic--.

At column 16, line 4, "deliver" should read --delivery--.

Signed and Sealed this

Thirtieth Day of November, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

At column 16, line 5, "fluid" should read --fluidic--.

At column 16, line 7, "deliver" should read --delivery--.

At column 16, line 8, "fluid" should read --fluidic--.

(12) **United States Patent**
Porter et al.

(10) **Patent No.: US 6,892,762 B2**
(45) **Date of Patent: May 17, 2005**

(54) **MANIFOLDED FLUID DELIVERY SYSTEM**

(75) Inventors: George K. Porter, Maple Glen, PA (US); Seth B. Wolf, Warminster, PA (US); Charles W. Albrecht, Furlong, PA (US)

(73) Assignee: Porter Instrument Company, Inc., Hatfield, PA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 170 days.

(21) Appl. No.: 10/087,709

(22) Filed: Feb. 28, 2002

(65) Prior Publication Data

US 2002/0124961 A1 Sep. 12, 2002

Related U.S. Application Data

(60) Provisional application No. 60/271,947, filed on Feb. 28, 2001.

(51) Int. Cl.[7] F16K 11/10

(52) U.S. Cl. 137/884

(58) Field of Search 137/884; 261/78.2

(56) References Cited

U.S. PATENT DOCUMENTS

2,871,887	A	2/1955	Obrebski et al.	
3,631,881	A	1/1972	Bowditch	
4,079,410	A	3/1978	Schierz	
4,458,841	A	7/1984	Laukaniemi et al.	
4,489,570	A	12/1984	Little	
4,794,981	A	1/1989	Mizuno	
5,099,311	A	3/1992	Bonde et al.	
5,161,089	A	11/1992	Chu et al.	
5,218,515	A	6/1993	Bernhardt	
5,355,942	A	10/1994	Conte	
5,488,925	A *	2/1996	Kumada	137/884
5,495,889	A	3/1996	Dubelloy	
5,539,617	A	7/1996	Bochtler	
5,655,290	A	8/1997	Moresco et al.	
5,675,974	A	10/1997	Heikrodt et al.	
5,692,558	A	12/1997	Hamilton et al.	
5,794,859	A	8/1998	Goenka et al.	
5,826,643	A	10/1998	Galyon et al.	
5,829,516	A	11/1998	Lavochkin	
5,870,823	A	2/1999	Bezama et al.	
5,901,037	A	5/1999	Hamilton et al.	
6,021,844	A	2/2000	Batchelder	
6,058,012	A	5/2000	Cooper et al.	
6,076,556	A	6/2000	Puchs et al.	
6,244,575	B1 *	6/2001	Vnarstra et al.	261/141

OTHER PUBLICATIONS

"What you can get in manifolds", Hydraulics and Pneumatics, vol. 16, No. 11 (Nov., 1963), pp. 88–89.*

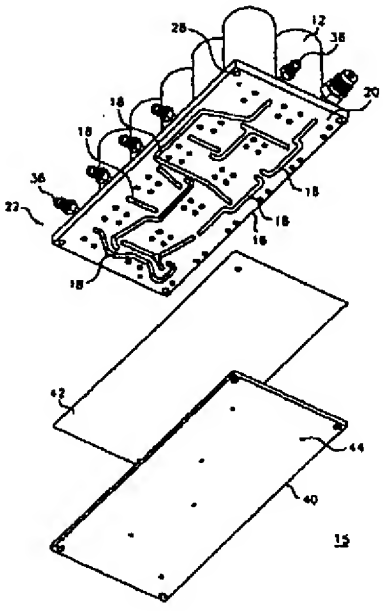
* cited by examiner

Primary Examiner—John Fox
(74) *Attorney, Agent, or Firm*—RatnerPrestia

(57) **ABSTRACT**

An integrated fluid delivery system (IFDS) is provided for delivering fluid streams such as high purity fluid streams to a processing destination, such as a wafer processing chamber. The delivery system includes a first modular manifold for internally channeling the high purity fluid streams along seamless slots. The first modular manifold receives each of the high purity fluid streams at a corresponding porting aperture. At least one fluid device from a group consisting of a flow controller, a valve, a filter and a pressure transducer is provided. The at least one fluid device is in fluidic communication with a corresponding one of the high purity liquid streams of the first modular manifold to dispense the high purity fluid streams from the integrated liquid delivery system to the wafer processing chamber.

35 Claims, 14 Drawing Sheets



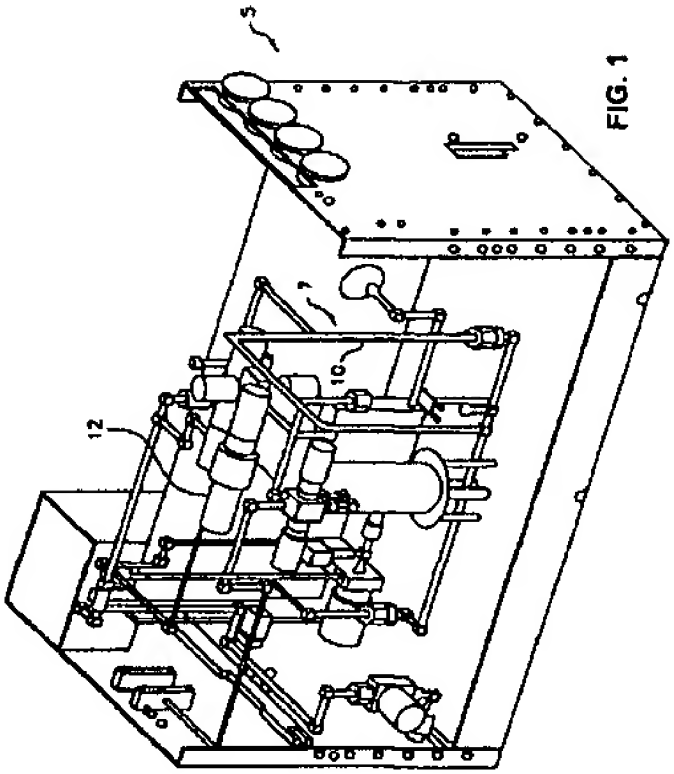


FIG. 1

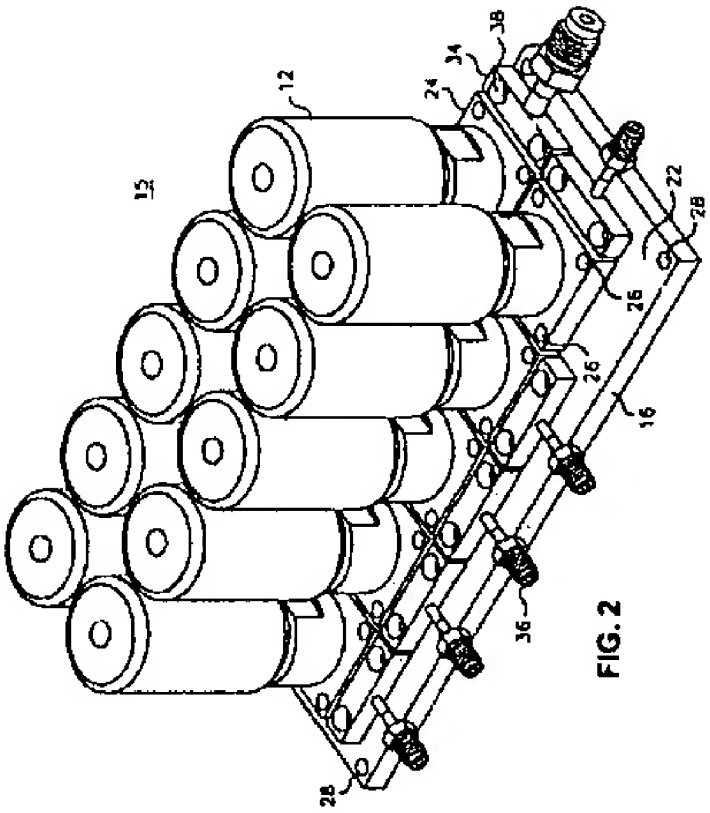


FIG. 2

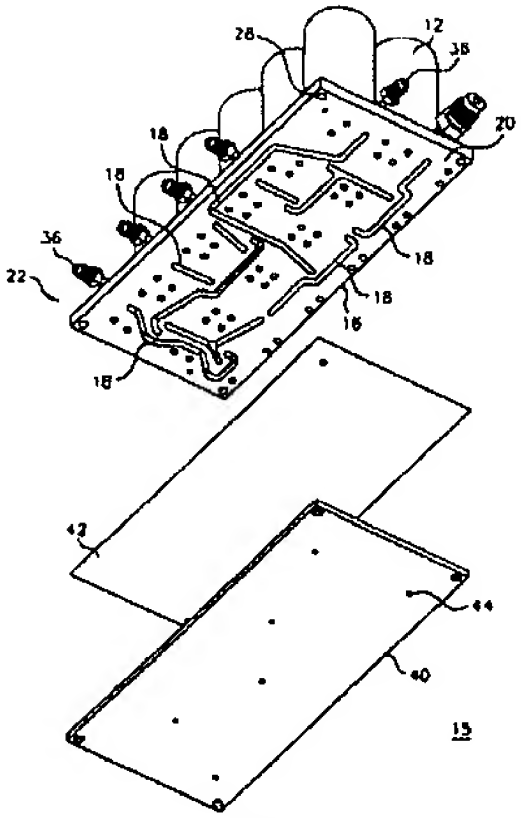


FIG. 3

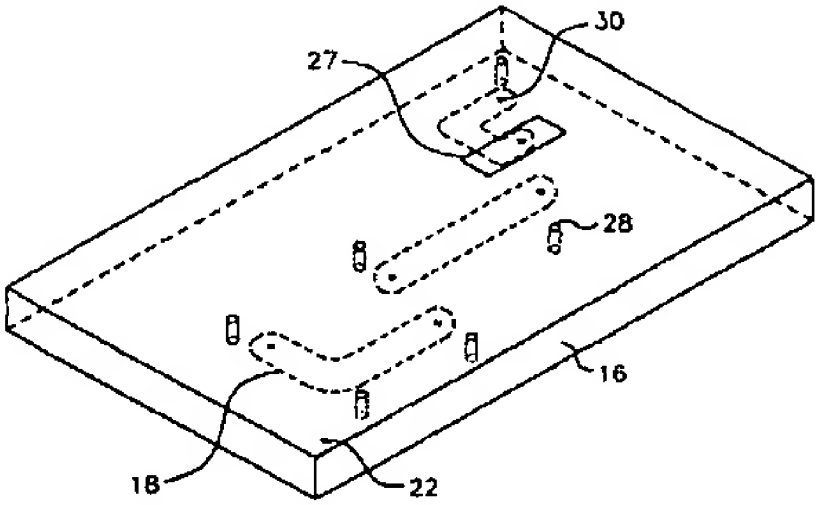


FIG. 4

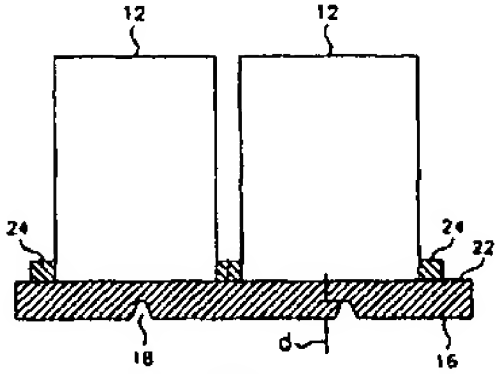


FIG. 5

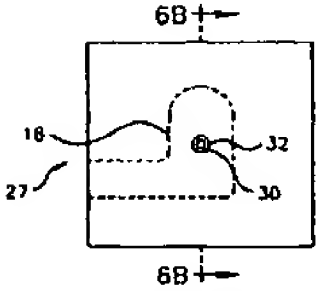


FIG. 6A

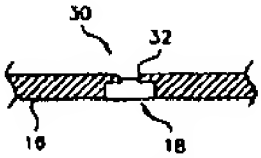


FIG. 6B

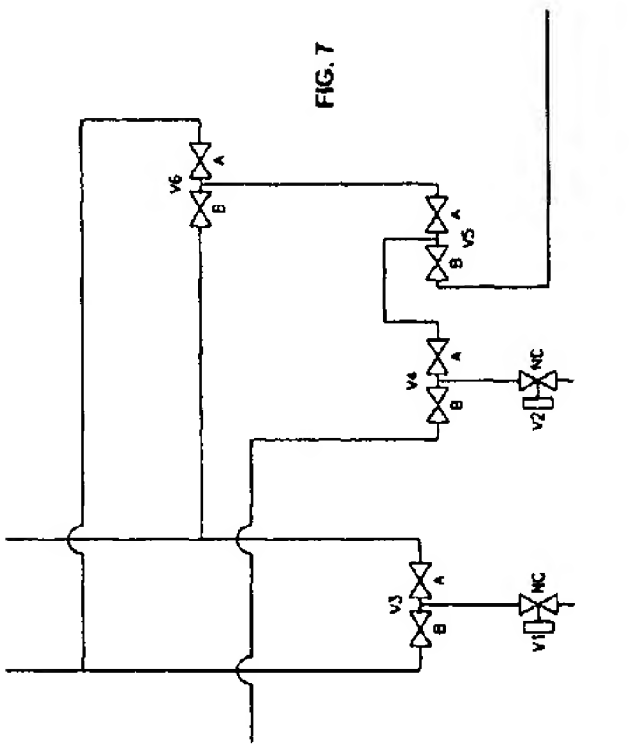


FIG. 7

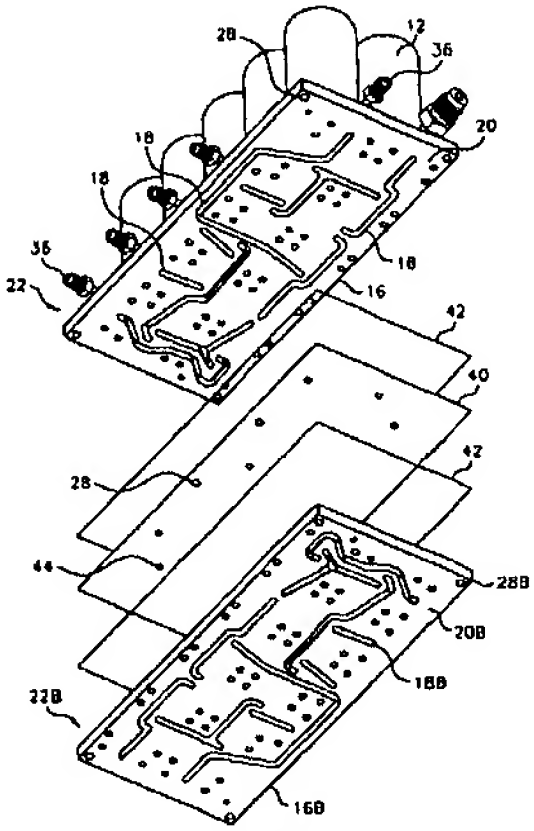


FIG. 8

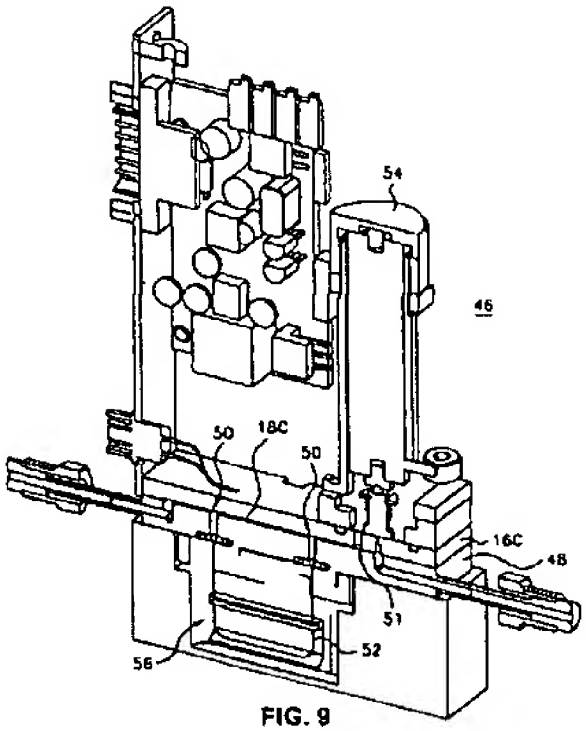


FIG. 9

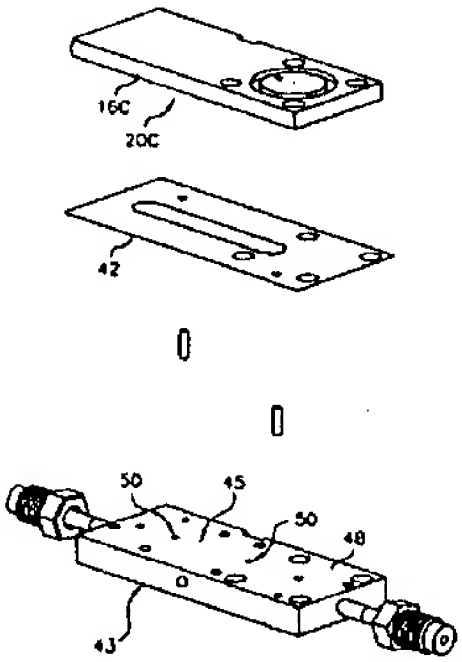


FIG. 10A

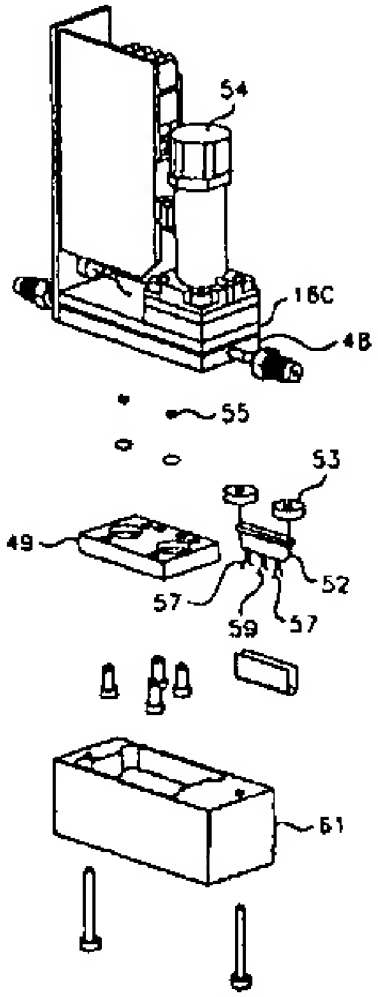


FIG. 10B

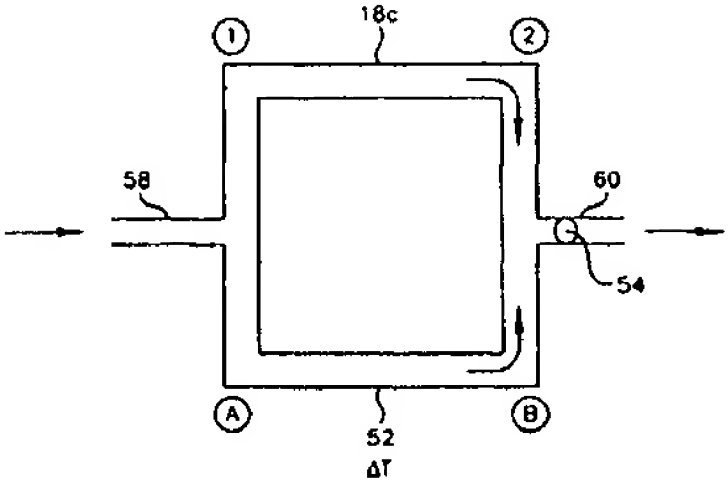


FIG. 11

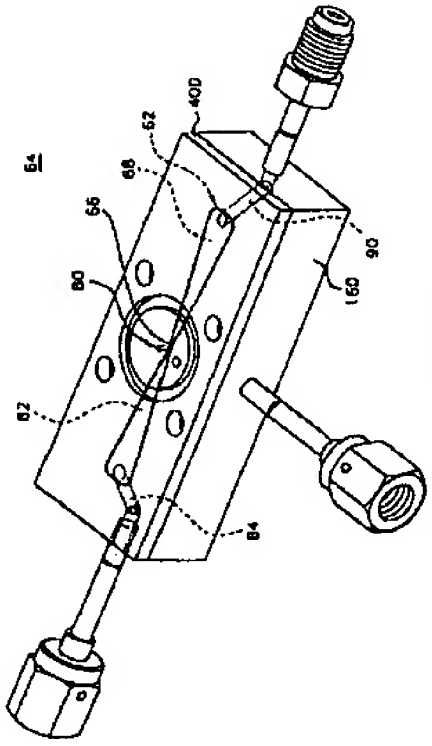


FIG. 12

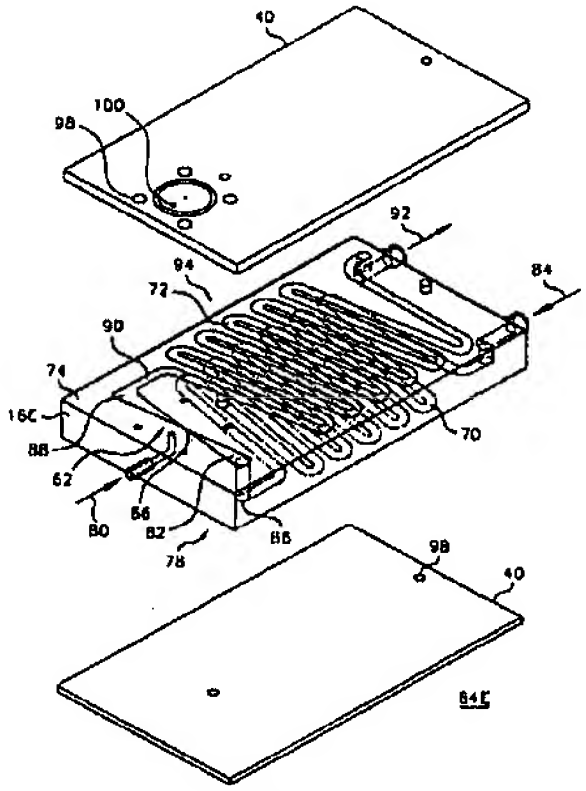


FIG. 13

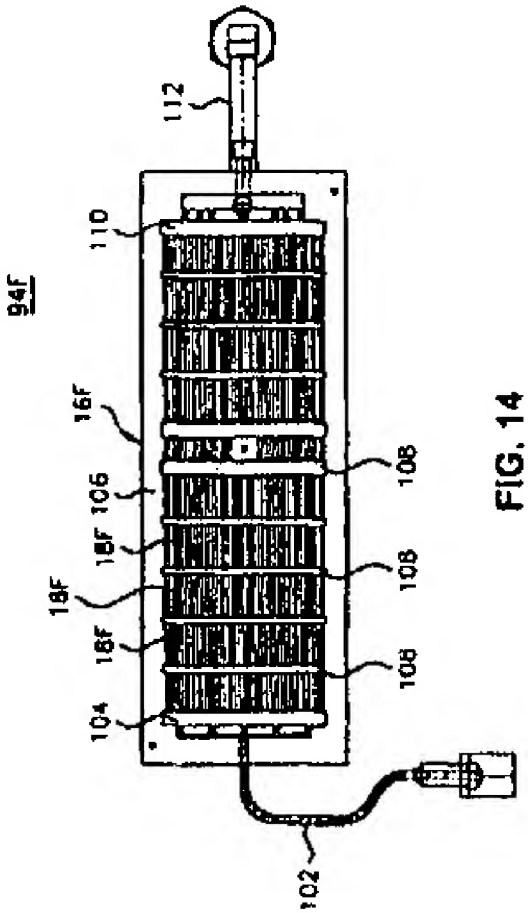


FIG. 14